EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

Cooler Master MWE Gold 650

Lab ID#: CM19650126
Receipt Date: Sep 26, 2019
Test Date: Oct 10, 2019

Report: 19PS875A
Report Date: Oct 22, 2019

DUT INFORMATION

Brand	Cooler Master
Manufacturer (OEM)	Huizhou Xin Hui Yuan Tech.
Series	MWE Gold
Model Number	MPY-6501-AFAAG-EU
Serial Number	MPY6501AFAAG1192800444
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	8.5
Rated Frequency (Hz)	50-60
Rated Power (W)	650
Type	ATX12V
Cooling	120mm Rifle Bearing Fan (DF1202512RFLN)
Semi-Passive Operation	✓
Cable Design	Fully Modular

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	ErP Lot 6 2010: ✓ ErP Lot 6 2013: ✓ ErP Lot 3 2014 & CEC: Partially
(EU) No 617/2013 Compliance	✓

115V

Average Efficiency	88.138%
Efficiency With 10W (≤500W) or 2% (>500W)	61.102
Average Efficiency 5VSB	77.954%
Standby Power Consumption (W)	0.0891190
Average PF	0.990
Avg Noise Output	35.29 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	Standard+

230V

Average Efficiency	90.259%
Average Efficiency 5VSB	76.030%
Standby Power Consumption (W)	0.1426270
Average PF	0.952
Avg Noise Output	35.35 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	Standard+

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	15	15	54.1	2.5	0.3
	Watts	100		649.2	12.5	3.6
Total Max. Power (W)		650				

HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	14.6
AC Loss to PWR_OK Hold Up Time (ms)	13.5
PWR_OK Inactive to DC Loss Delay (ms)	1.1

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CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (610mm)	1	1	18-22AWG	No
8 pin EPS12V (660mm) / 4+4 pin EPS12V (120mm)	1	2	16-18AWG	No
6+2 pin PCIe (610mm+120mm)	2	4	16-18AWG	No
SATA (400mm+120mm+120mm+120mm)	2	8	18AWG	No
4-pin Molex (410mm+120mm+120mm)	1	3	18AWG	No
4-pin Molex (410mm+120mm+120mm) / FDD (+120mm)	1	3 / 1	18-22AWG	No
AC Power Cord (1380mm) - C13 coupler	1	1	18AWG	-

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General Data	
Manufacturer (OEM)	Huizhou Xin Hui Yuan Tech
PCB Type	Double Sided
Primary Side	
Transient Filter	4x Y caps, 3x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	1x GBU15J (600V, 15A @ 100°C)
APFC MOSFETS	2x NCE Power NCE65T180F (650V, 13.2A @ 100°C, 0.18Ohm)
APFC Boost Diode	1x ON Semiconductor RHRP1560 (600V, 15A @ 140°C)
Hold-up Cap(s)	1x Elite (400V, 390uF, 2,000h @ 85°C, GM)
Main Switchers	4x Champion GPT10N50AD (500V, 9.7A, 0.7Ohm)
APFC Controller	ON Semiconductor NCP1654
Resonant Controllers	Champion CM6901T6
Topology	Primary side: Full-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	2x Excelliance MOS Corp EMP16N04HS (40V, 100A @ 100°C, 1.6mOhm)
5V & 3.3V	DC-DC Converters:4x Excelliance MOS Corp EMB06N03HR (30V, 45A @ 100°C, 6mOhm) PWM Controllers: uPI Semi uP3861P
Filtering Capacitors	Electrolytics: 13x Elite (4-10,000h @ 105°C, EY) Polymers: 10x Elite
Supervisor IC	Sitronix ST9S313-DAG (OVP, UVP, SCP)
Fan Model	CoolerMaster (A12025-25RB-3IN-F1) DF1202512RFLN (120mm, 12V, 0.16A, Rifle Bearing Fan)
5VSB Circuit	
Rectifier	1x ON Semiconductor MBR2045CTG SBR (45V, 20A @ 163°C)
Standby PWM Controller	Infineon ICE2QR4765

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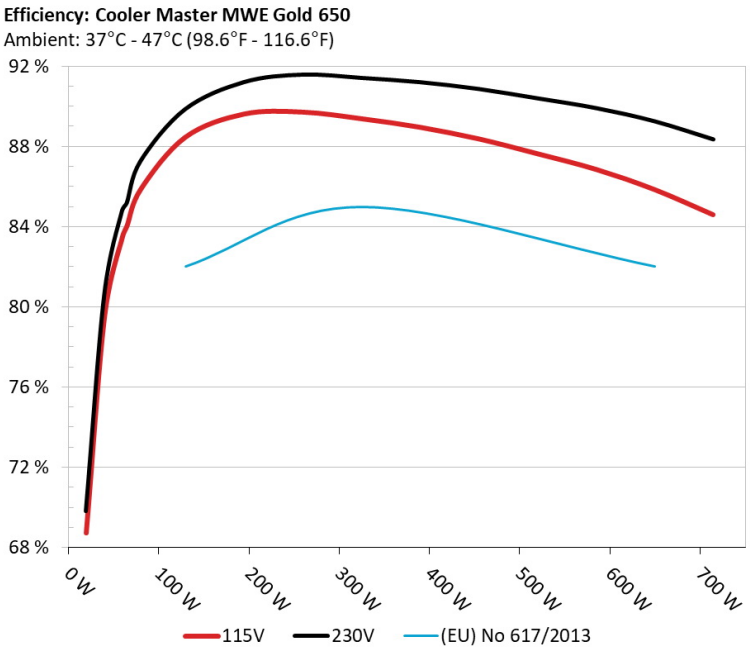
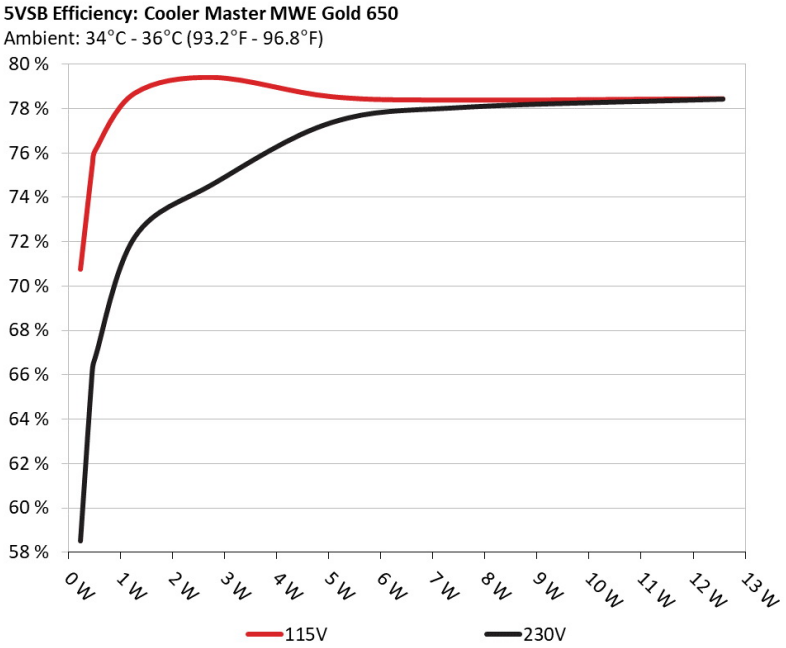
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



INFO

The PSU`s efficiency under high ambient temperatures with 115V and 230V input. For this graph the results of the 10-110% load regulation table are used

5VSB EFFICIENCY



INFO

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

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5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	70.769%	0.046
	5.092V	0.325		115.11V
2	0.090A	0.459	75.493%	0.085
	5.092V	0.608		115.11V
3	0.550A	2.794	79.420%	0.323
	5.080V	3.518		115.11V
4	1.000A	5.068	78.549%	0.408
	5.068V	6.452		115.11V
5	1.500A	7.582	78.399%	0.450
	5.054V	9.671		115.11V
6	2.500A	12.570	78.460%	0.493
	5.028V	16.021		115.11V

5VSB EFFICIENCY -230V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	58.524%	0.017
	5.093V	0.393		230.24V
2	0.090A	0.459	66.234%	0.029
	5.092V	0.693		230.24V
3	0.550A	2.795	74.613%	0.144
	5.080V	3.746		230.24V
4	1.000A	5.069	77.366%	0.222
	5.068V	6.552		230.23V
5	1.500A	7.583	78.038%	0.282
	5.055V	9.717		230.24V
6	2.500A	12.571	78.407%	0.353
	5.028V	16.033		230.24V

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Cooler Master MWE Gold 650

115V

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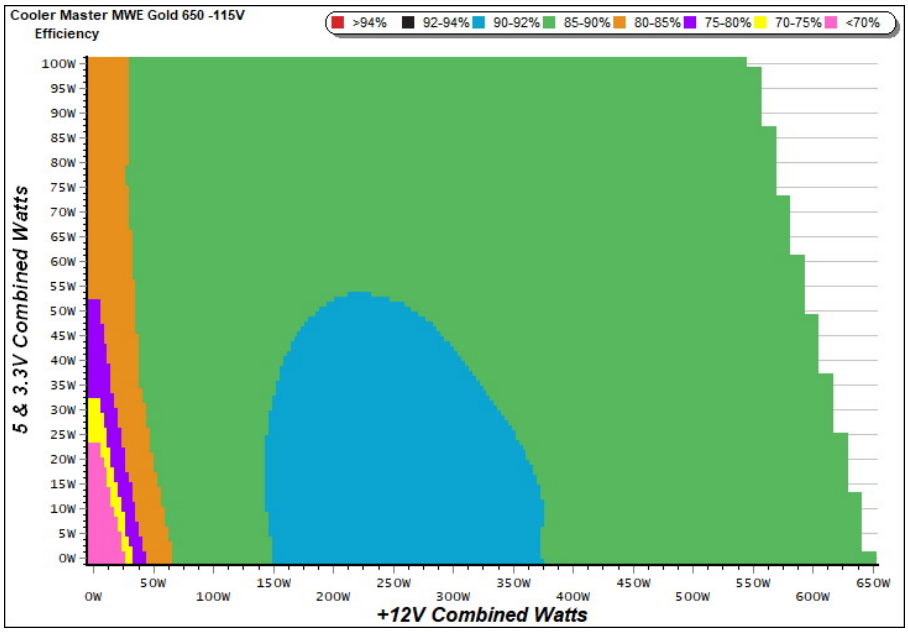
EFFICIENCY GRAPH 115V



INFO

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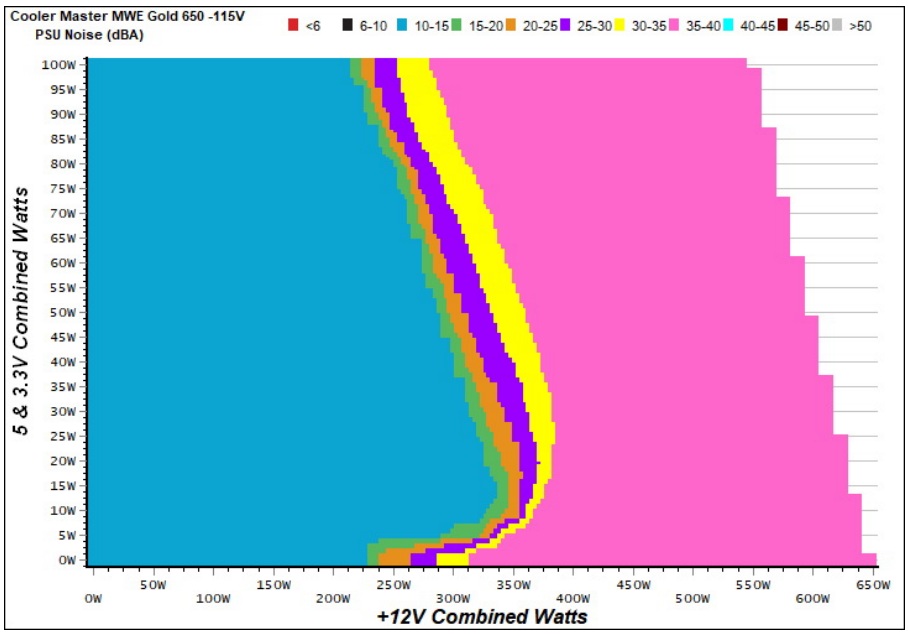
NOISE GRAPH 115V



INFO

The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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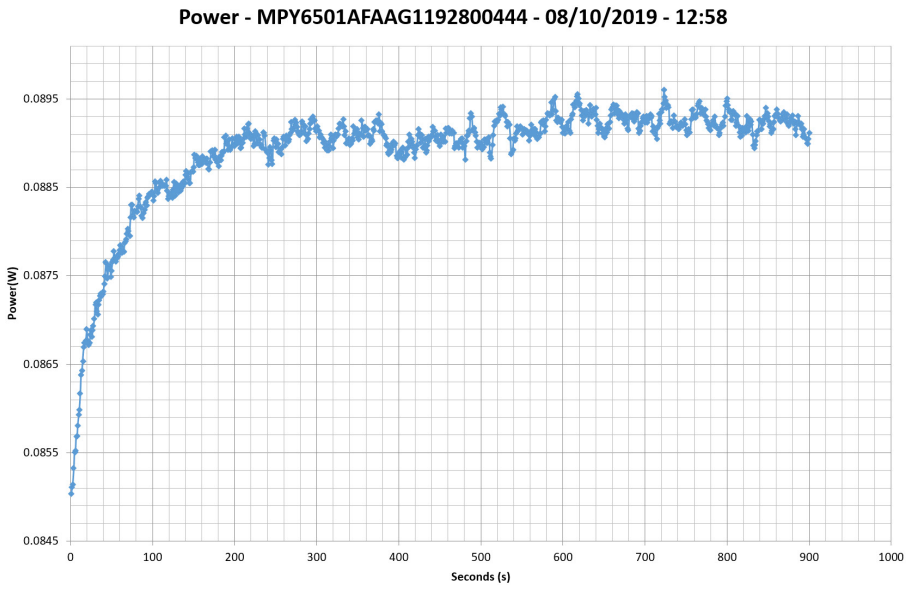
VAMPIRE POWER -115V



INFO

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10-110% LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	3.572A	1.992A	1.979A	0.990A	64.918	84.036%	916	12.4	40.04°C	0.967
	12.126V	5.022V	3.335V	5.052V	77.250				42.55°C	115.11V
2	8.130A	2.993A	2.977A	1.191A	129.399	88.440%	920	12.4	40.24°C	0.988
	12.115V	5.013V	3.325V	5.038V	146.312				43.34°C	115.11V
3	13.093A	3.496A	3.466A	1.393A	194.487	89.595%	928	12.4	41.68°C	0.987
	12.105V	5.005V	3.318V	5.024V	217.074				44.97°C	115.11V
4	18.066A	4.003A	3.987A	1.597A	259.714	89.691%	1856	31.7	42.24°C	0.991
	12.095V	4.998V	3.310V	5.011V	289.565				46.21°C	115.11V
5	22.719A	5.012A	4.998A	1.802A	324.987	89.361%	2404	39.1	42.84°C	0.994
	12.082V	4.988V	3.300V	4.996V	363.678				47.61°C	115.11V
6	27.317A	6.028A	6.017A	2.008A	389.508	88.937%	2416	39.2	43.01°C	0.995
	12.069V	4.979V	3.291V	4.982V	437.959				48.19°C	115.11V
7	31.991A	7.046A	7.039A	2.215A	454.826	88.356%	2428	39.4	43.22°C	0.996
	12.057V	4.969V	3.281V	4.968V	514.767				49.05°C	115.10V
8	36.671A	8.068A	8.073A	2.424A	520.121	87.617%	2435	39.5	44.68°C	0.997
	12.045V	4.959V	3.271V	4.952V	593.628				51.00°C	115.10V
9	41.759A	8.586A	8.582A	2.429A	585.028	86.838%	2437	39.5	45.53°C	0.997
	12.034V	4.950V	3.262V	4.942V	673.699				52.55°C	115.10V
10	46.789A	9.109A	9.129A	2.536A	649.759	85.835%	2407	39.1	46.09°C	0.997
	12.023V	4.942V	3.253V	4.930V	756.989				53.78°C	115.10V
11	52.227A	9.123A	9.152A	2.541A	714.570	84.585%	2400	39.1	46.53°C	0.998
	12.012V	4.934V	3.245V	4.922V	844.798				55.16°C	115.10V
CL1	0.144A	11.999A	11.999A	0.000A	101.335	83.257%	1818	31.2	42.96°C	0.990
	12.103V	4.993V	3.307V	5.052V	121.713				47.12°C	115.12V
CL2	54.097A	1.001A	0.999A	1.000A	664.439	86.461%	2400	39.1	45.88°C	0.997
	12.038V	4.961V	3.272V	4.986V	768.484				53.18°C	115.10V

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20-80W LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.198A	0.495A	0.479A	0.197A	19.626	68.738%	903	12.7	0.820
	12.132V	5.030V	3.342V	5.083V	28.552				115.12V
2	2.448A	0.995A	0.988A	0.394A	39.996	79.535%	909	12.5	0.927
	12.130V	5.027V	3.340V	5.074V	50.287				115.12V
3	3.637A	1.492A	1.469A	0.593A	59.507	83.434%	913	12.4	0.959
	12.127V	5.024V	3.337V	5.065V	71.322				115.12V
4	4.890A	1.992A	1.982A	0.791A	79.894	85.840%	915	12.4	0.974
	12.124V	5.021V	3.333V	5.056V	93.073				115.11V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.8 mV	6.5 mV	6.8 mV	6.0 mV	Pass
20% Load	16.5 mV	7.5 mV	7.8 mV	6.5 mV	Pass
30% Load	19.3 mV	8.5 mV	8.8 mV	7.5 mV	Pass
40% Load	18.6 mV	9.3 mV	10.2 mV	9.6 mV	Pass
50% Load	20.7 mV	10.1 mV	11.4 mV	10.1 mV	Pass
60% Load	24.1 mV	10.9 mV	13.2 mV	9.8 mV	Pass
70% Load	27.3 mV	12.2 mV	15.9 mV	10.8 mV	Pass
80% Load	30.0 mV	13.6 mV	16.4 mV	11.4 mV	Pass
90% Load	32.6 mV	14.0 mV	17.7 mV	11.7 mV	Pass
100% Load	51.3 mV	16.4 mV	21.2 mV	13.1 mV	Pass
110% Load	55.1 mV	17.0 mV	20.8 mV	14.6 mV	Pass
Crossload 1	20.1 mV	9.6 mV	12.1 mV	21.0 mV	Pass
Crossload 2	51.8 mV	15.8 mV	17.2 mV	14.3 mV	Pass

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230V

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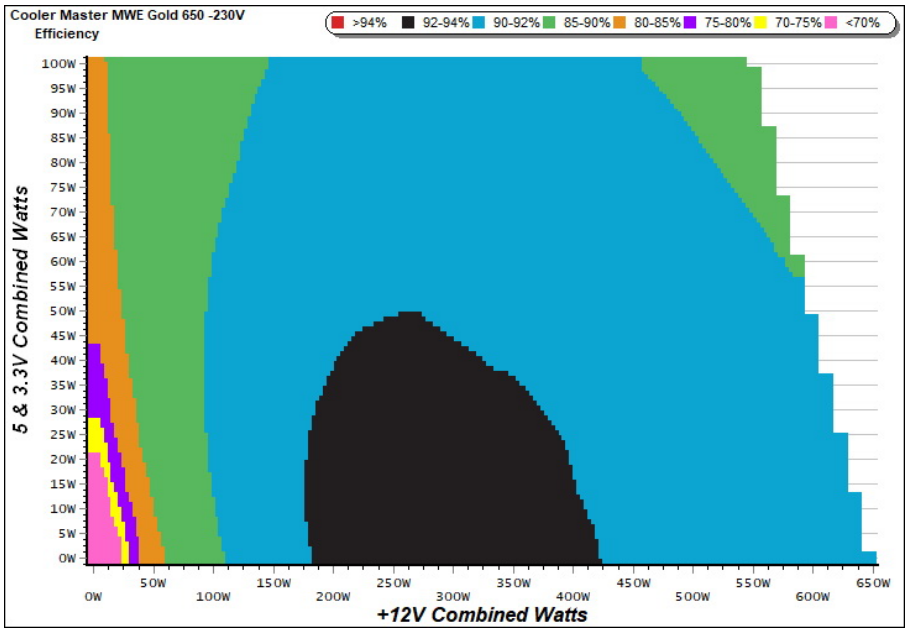
EFFICIENCY GRAPH 230V



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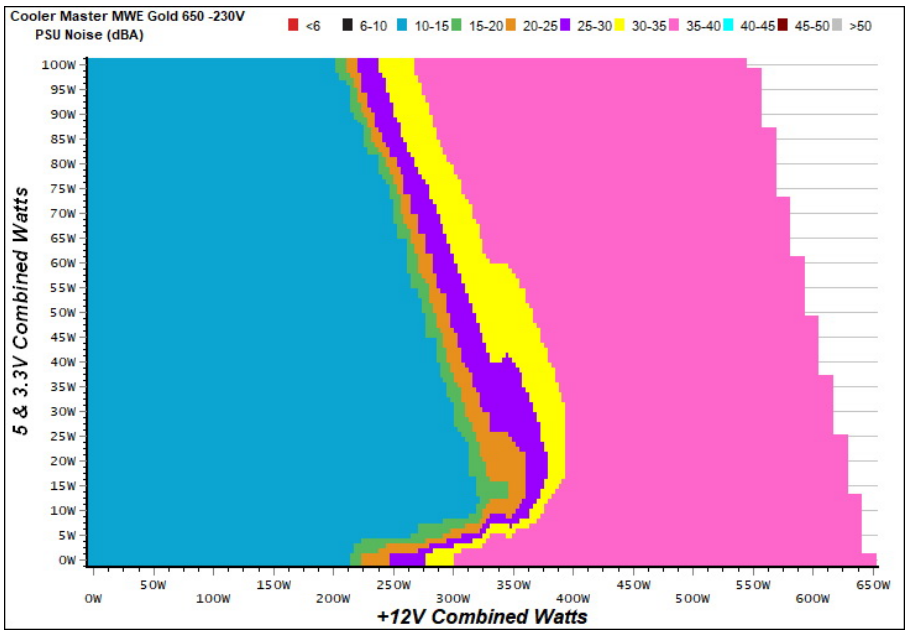
NOISE GRAPH 230V



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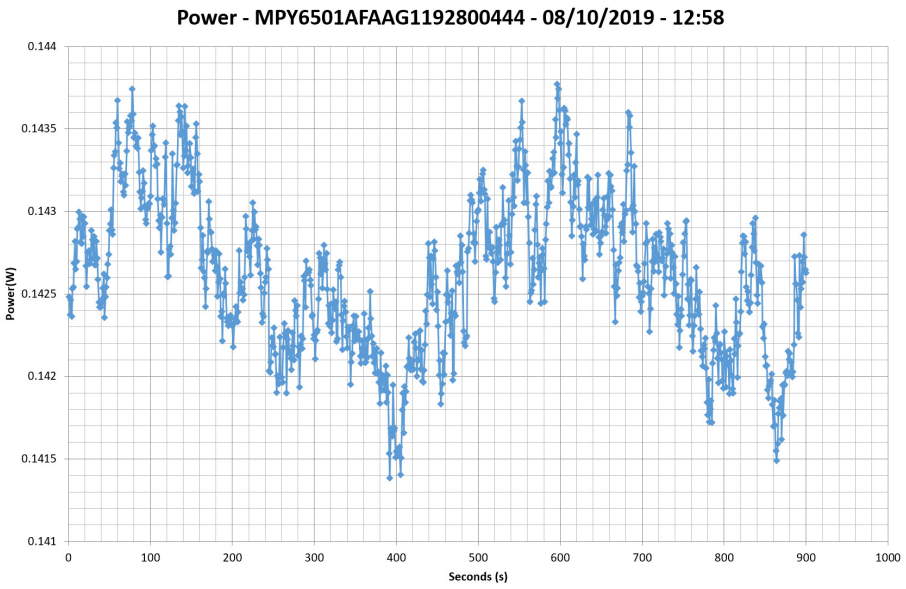
VAMPIRE POWER -230V



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10-110% LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	3.576A	1.993A	1.978A	0.990A	64.956	85.189%	917	12.4	40.21°C	0.788
	12.125V	5.017V	3.335V	5.052V	76.249				42.47°C	230.25V
2	8.134A	2.996A	2.975A	1.191A	129.439	89.853%	921	12.4	40.85°C	0.911
	12.115V	5.008V	3.325V	5.038V	144.057				43.58°C	230.25V
3	13.097A	3.500A	3.467A	1.393A	194.525	91.207%	927	12.4	41.00°C	0.949
	12.104V	5.000V	3.317V	5.024V	213.278				44.36°C	230.26V
4	18.073A	4.008A	3.987A	1.597A	259.760	91.583%	1585	28.3	41.78°C	0.964
	12.093V	4.992V	3.309V	5.011V	283.632				45.53°C	230.25V
5	22.725A	5.019A	5.001A	1.801A	325.031	91.420%	2399	39.1	42.05°C	0.977
	12.080V	4.983V	3.300V	4.997V	355.535				46.26°C	230.25V
6	27.324A	6.037A	6.019A	2.007A	389.546	91.207%	2414	39.2	42.79°C	0.980
	12.067V	4.973V	3.290V	4.984V	427.100				47.64°C	230.25V
7	31.997A	7.054A	7.045A	2.215A	454.876	90.867%	2429	39.4	43.68°C	0.985
	12.056V	4.963V	3.280V	4.968V	500.593				49.06°C	230.25V
8	36.681A	8.079A	8.075A	2.424A	520.173	90.400%	2438	39.5	43.81°C	0.986
	12.043V	4.953V	3.270V	4.952V	575.410				49.70°C	230.25V
9	41.766A	8.598A	8.588A	2.429A	585.099	89.912%	2444	39.5	44.49°C	0.987
	12.033V	4.945V	3.261V	4.943V	650.746				51.00°C	230.25V
10	46.802A	9.123A	9.132A	2.536A	649.831	89.255%	2447	39.6	45.23°C	0.988
	12.021V	4.935V	3.252V	4.931V	728.065				52.45°C	230.26V
11	52.242A	9.135A	9.155A	2.541A	714.649	88.357%	2450	39.6	46.66°C	0.989
	12.010V	4.928V	3.244V	4.922V	808.822				55.35°C	230.26V
CL1	0.147A	12.003A	11.999A	0.000A	101.330	84.577%	1696	29.3	42.45°C	0.876
	12.102V	4.988V	3.307V	5.053V	119.808				46.58°C	230.26V
CL2	54.100A	1.003A	0.999A	1.000A	664.426	89.934%	2447	39.6	45.48°C	0.988
	12.037V	4.955V	3.271V	4.986V	738.797				52.46°C	230.26V

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› The link to the original test results document should be provided in any case

Anex

Cooler Master MWE Gold 650

20-80W LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.200A	0.498A	0.478A	0.197A	19.664	69.835%	910	12.5	0.542
	12.134V	5.028V	3.342V	5.081V	28.158				230.26V
2	2.451A	0.996A	0.988A	0.394A	40.032	80.622%	911	12.5	0.677
	12.129V	5.025V	3.340V	5.073V	49.654				230.25V
3	3.640A	1.495A	1.469A	0.593A	59.549	84.771%	913	12.4	0.766
	12.126V	5.019V	3.337V	5.065V	70.247				230.26V
4	4.895A	1.993A	1.981A	0.791A	79.941	87.258%	915	12.4	0.830
	12.123V	5.016V	3.333V	5.056V	91.615				230.26V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	12.0 mV	7.0 mV	7.4 mV	6.3 mV	Pass
20% Load	16.6 mV	7.5 mV	7.7 mV	6.9 mV	Pass
30% Load	20.9 mV	8.2 mV	8.6 mV	8.3 mV	Pass
40% Load	18.0 mV	8.9 mV	10.3 mV	9.7 mV	Pass
50% Load	21.1 mV	10.2 mV	11.8 mV	10.1 mV	Pass
60% Load	23.7 mV	11.2 mV	13.3 mV	10.0 mV	Pass
70% Load	26.7 mV	12.5 mV	14.3 mV	11.1 mV	Pass
80% Load	29.2 mV	13.0 mV	16.6 mV	12.2 mV	Pass
90% Load	33.0 mV	13.9 mV	16.9 mV	13.3 mV	Pass
100% Load	51.2 mV	16.7 mV	20.6 mV	12.8 mV	Pass
110% Load	55.5 mV	16.9 mV	21.0 mV	13.7 mV	Pass
Crossload 1	22.2 mV	10.5 mV	12.4 mV	21.0 mV	Pass
Crossload 2	51.7 mV	14.6 mV	16.8 mV	12.8 mV	Pass

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Anex

Cooler Master MWE Gold 650

Top side

Power specifications label

CERTIFICATIONS 115V

CYBENETICS GOLD

CYBENETICS STANDARD+

CERTIFICATIONS 230V

CYBENETICS GOLD 230v

CYBENETICS STANDARD+ 230v

Aristeidis Bitziopoulos
Lab Director

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Cybenetics offers the ETA and Lambda voluntary certification programs, through which the efficient and silent power supplies are promoted

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